habroptilus) from New Zealand, a Grey Ichneumon (*Herpestes griseus*) from India, deposited; a Yellow Baboon (*Cynocephalus babouin*) from W. Africa, purchased; a Gavial (*Gavialis gangeticus*) from India, presented by Capt. Barnet: a Common Fox (*Canis vulpes*) European, presented by Mr. W. Saville.

SCIENTIFIC SERIALS

THE *Journal of the Royal Agricultural Society of England*, Second Series, No. xxii.—The contents of this number are most attractive. To science is assigned the leading place in the arrangement. The first paper is devoted to the Colorado potato-beetle, and is from the pen of Mr. Bates, F.L.S., who does not profess to impart any original information, and who is unable to come to any definite conclusion as to the probability of its appearing in these countries. The paper is calculated to confuse rather than to enlighten us on this point. For while in one place the author goes to show that the possibility of living specimens arriving here cannot be doubted, he observes elsewhere that the analogies of the case supply ground for confidently believing that there is exceedingly little probability of their propagating and spreading in this country. We are also told that "the creature has developed extraordinary flexibility of constitution and habits since it left its quiet home in the Rocky Mountains, and that we cannot be quite sure what it will eventually do." In another passage Mr. Bates says:—"The potato-beetle is no insidious enemy, like the majority of insect plagues, but meets the farmer in open fair fight." What does he mean by a fair fight between an insect which destroys whole fields and districts, and the helpless farmer?—Mr. Carruthers, F.R.S., consulting botanist to the Society, contributes a paper and a note on the potato disease. In the "paper" he reports on what he calls the results of the competition for the prizes offered through the Society in 1874 for potatoes which would resist the disease for three years in succession. The "note" gives a brief account of Mr. Worthington Smith's discovery of the resting spore of the potato fungus. The paper must have been written before the discovery. The truth is the discovery throws a curious shadow not only on the paper but on the course pursued by the society in connection with the whole subject. We were not quite prepared to find that the consulting botanist of this great society would be permitted to announce, as he has done in this paper, that in investigating this disease we must summarily dismiss the soil from our consideration. "Neither soil, nor methods of cultivation," we are told, "exercise any influence on the prevalence of the disease." For the present we can only say these statements are as unsound as they are astounding. The *Journal* contains a long paper on laying down land to permanent pasture, which is a joint production. The bulk of the information is given second-hand; that is to say, on information furnished by several agriculturists, a long paper is based by the joint authors. The number contains too much matter of this character. The views of an American naturalist on the Colorado potato-beetle are given in a paper by Mr. Bates. Mr. Carruthers seeks to enlighten us on the potato disease by information collected from various sources; and a number of scattered facts on one of the most important of agricultural subjects—the profitableness of pasture as compared with arable land—are grouped and reviewed in a great variety of ways, some of which are calculated rather to mislead than to enlighten the reader. There are several passages in the paper which will produce the impression that the gentleman to whom has been assigned the chief part of the joint authorship is not intimately acquainted with agriculture as at present practised. We take one passage as an illustration: "There are many persons so enamoured of a special rotation—say the four-course—that to extend the period of artificial grass to two years appears to them a violation of all the true principles of scientific farming. The four-course is their ideal of modern farming. A course of cropping which has been proved highly beneficial on some of our most famous corn-growing districts is supposed to be the only legitimate system to be pursued by intelligent farmers elsewhere." Who are the persons referred to? It may be well to remind the gentleman who wrote this paper that English farmers are calling out for more freedom of action in the cropping of their land, and that for several years past vast numbers of them have been doing that which he would appear to have discovered in 1875. We cannot at present make room for further criticism on this paper; and we are glad to be able to state that the number contains several meritorious articles.

THE *Journal of the Chemical Society* for November contains Dr. Hofmann's Faraday lecture, entitled "The Life-work of Liebig in Experimental and Philosophic Chemistry; with allusions to his influence on the development of the collateral sciences and of the useful arts." The lecture is illustrated by a portrait of Liebig, and an autotype copy of a letter from Liebig to Faraday.—Prof. J. W. Mallet contributes a paper on achrematite, a new molybdo-arsenate of lead, and Mr. W. J. Lewis a note on the crystallography of Leucaurin, being an appendix to a former paper by Messrs. Dale and Schorlemmer.—The journal contains its usual number of valuable abstracts from foreign periodicals.

Morphologisches Jahrbuch.—In the second part of this journal Dr. B. Solger discusses the homology of the cervical vertebræ and nerves in the Sloths, and concludes that the vertebræ up to the 22nd are homologous in Cholœpus and Bradypus, but that the homologies of the first twelve nerves cannot be determined; the nerves from the 13th to the 23rd are homologous.—Another paper by Dr. Solger describes two cartilaginous pieces in the visceral skeleton of *Chimæra monstrosa*, which appear to have been hitherto unnoticed.—Dr. Hermann Fol gives an account of the so-called endostyle of Huxley in various genera of Tunicata, and appears to establish it satisfactorily as a slime-gland. Excellent figures of its ciliated and glandular epithelia are given.—Prof. Gegenbaur devotes twenty-two pages to a consideration of the omohyoid muscle, which he believes to be a remnant of a continuous muscle whose origin extended from the sternum along the clavicle to the scapula. He also gives an account, with microscopic sections, of the nipples in *Didelphys* and in *Mus decumanus*.—Dr. Carl Hasse's paper on *Amphioxus lanceolatus* is devoted to a demonstration of the structure of the eyespots, in which he finds cells which may be designated optic cells, as distinguished from the pigment-cells.—Prof. Gegenbaur occupies forty-seven pages with a detailed and very hostile criticism of Götte's recently-published work on the Development of the Toad as a basis for the Comparative Anatomy of the Vertebrata. He censures it in very many respects as empirical and unscientific.

Jahrbuch der kais.-kön. geologischen Reichsanstalt, band xxv. No. 2.—In this number of the Jahrbuch, Dr. E. Tietze, who has been some time in Persia, describes the springs and spring-formations that occur in Demavend mountain and its neighbourhood; most of the springs are thermal, and deposit large quantities of calcareous tufa.—The next paper gives details of the work done in the chemical laboratory of the Geological Survey, and includes upwards of 200 analyses.—Dr. C. Doelter describes the geological structure, the rocks, and minerals of the Monzoni Alps in the Tyrol. This paper is illustrated with a geological sketch-map and two plates of minerals.—Among the "Mineralogical communications" the most generally interesting paper is one by Professor Fuchs on the earthquakes and volcanic eruptions of 1874. He enumerates 123 earthquakes, distributed as follows:—Winter 37; (Jan. 12, Feb. 15, Dec. 10); Spring 32; (March 12, April 11, May 9); Summer 25; (June 7, July 5, Aug. 13); Autumn 29; (Sep. 9, Oct. 9, Nov. 11).—The remaining papers are these:—"On Sahlite as a rock-constituent," by E. Kallowsky; "On the chemical composition of meionite," by E. F. Neminar; "On Lievrite," by L. Sipócz; "On the minerals occurring in the metalliferous veins of the Pribram region," by F. Babanetk; "On rocks from the island of Samothracia," by J. Niedzwiedzki.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Dec. 9.—"On some Electro-magnetic Rotations of Bar-magnets and Conducting-wires on their Axes," by G. Gore, F.R.S.

In all the published forms of Ampère's experiment of the electro-magnetic rotation of a vertical bar-magnet or conducting-wire upon its axis by Ampère, Faraday, Sturgeon and others, the magnet or wire has either been immersed a large portion of its depth in mercury, or its middle part has been connected by a wire with a surrounding annular channel filled with mercury, and the electric current passed into or out of the magnet or wire by means of that liquid, and the mercury has formed an essential part of the arrangement.

In all published cases of rotation of bar-magnets on their axes by the influence of electric currents, the two ends of the magnet

has had *dissimilar* poles. By meditating upon certain facts connected with this subject, I concluded that, by passing a current from one end to the other of a magnetized rod or wire having *similar* poles at its two ends, the magnet would probably rotate, and experiment has demonstrated that conclusion.

Upon a thin wooden tube 15 centims. long and 7 millims. bore, I wound a cotton-covered copper wire 1·7 millim. diameter, from one end of the tube to the middle, then reversed the direction of winding, and continued to the other end and back to the middle, again reversed, and coiled to the first end of the tube; by which arrangement the passage of a current through the coils produced two similar poles at the ends of the tube, and two others of the opposite kind at the middle.

The tube being now fixed in a vertical position, a straight iron wire 15 centims. long, and 1·8 millim. diameter, pointed at its lower end, and surmounted by a brass mercury cup 5 millims. diameter, containing a drop of mercury, was supported entirely within the tube and free to rotate, by a similar cup (surmounting a fixed vertical brass rod), at the lower end of the tube; the upper end of the axial wire being kept in position by a vertical brass rod fixed above the coil and terminated at its lower end by a sharp point of platinum in the mercury cup.

A current from 6 one-pint Grove's elements, arranged as 3, being now passed through the coil, brass rods, and axial wire, the latter rotated rapidly.

A copper wire substituted for the iron one would not rotate, probably because copper is so little capable of acquiring longitudinal magnetism.

To ascertain if the coil-current simply performed the function of longitudinally magnetizing the axial wire, I took an iron wire 23 centimes. long and 2·7 millims. diameter, sharp-pointed at its lower end; soldered to its upper end a double wire of cotton-covered copper, each wire being 1·7 millim. diameter, coiled the double wire upon the axial rod in two layers, and so as to enable two *similar* poles to be formed at the extremities of the axis, and terminated the copper wires by a little brass mercury-cup just above the top end of the vertical iron axis. By supporting this apparatus as the axial wire in the previous experiment, and passing the current, rotation occurred.

Reversing the direction of the current did not reverse the direction of rotation.

These experiments, produce a striking effect in a lecture, because the rotation appears to be produced without reaction of the moving part of the apparatus upon any external or fixed body.

In each of these cases of rotation, an upward vertical current entering a lower south pole or leaving an upper one, caused the upper end of the rod to rotate in the direction of the hands of a watch, and a downward current entering or leaving a north pole also produced that direction of motion, and reversing the poles in either case reversed the effect.

In each of these instances of rotation, without the aid of a current near the middle of the magnet, the coil being so constructed that the current in it could not be reversed without reversing that in the fixed conductors near it, reversing the direction of the current did not reverse that of the rotation, because the two acting influences were reversed together, and therefore each apparatus had its own direction of rotation, either right handed (↷) or left handed,* according to the direction in which its coils were wound. It follows from this that a current, the direction of which is alternately reversed, will drive the apparatus quite as well as one in one uniform direction.

I now endeavour to increase the effect. For this purpose I substituted for the upper brass rod a fixed coil consisting of one layer of copper wire upon an iron wire axis, but having dissimilar poles at its ends and no poles at its middle part, and placed between it and the lower brass rod a right-handed one free to rotate. The opposed poles of the fixed and movable coils were of opposite kinds, *i.e.* north and south. On passing a current from a Noe's thermo-pile of 96 elements,† connected as 24, rapid rotation in a right-handed direction occurred. I now substituted for the lower brass rod another fixed coil, similar to the upper one, but of an opposite direction of polarity, and passed the current again; still more rapid rotation in the same direction took place, and the effect was very striking. In this latter instance, two south poles free to move were opposed to two fixed north poles, and in each instance the current was passed upwards.

I now substituted for the movable coil a vertical wire of iron 13 centims. long and 1·7 millim. diameter, surmounted by a small brass mercury cup; passed the current from the thermo-pile, and obtained rotation, but less rapid than before; but by inclosing this wire in the axis of a fixed coil which produced appropriate and similar poles at its two ends, as in paragraph 3, and repeating the experiment, very great velocity of rotation was obtained. Rotation of a somewhat thicker wire of nickel was also obtained, both with and without the aid of the current in the middle fixed coil. I also tried, without the aid of the middle fixed coil, and with it, a copper wire of similar dimensions to the iron one, and obtained rotation freely. Each of these rotations agreed in direction with those of the movable coil.

The apparatus represented in the annexed sketch was employed for nearly all the various modifications of the experiment, by substituting for one or more of the coils metallic wires, &c., as desired. The upper part of the brass pillar A was capable of sliding in the lower part B, and could be fixed by a screw C, which encircled the split end of the tube B. The fine adjustment was effected by means of the screw D, the lower end of which rested upon the top of a tall brass rod inside the brass pillar. The upper and lower fixed coils or rods E and F were insulated from the brass clips G and H, and the battery was attached to the binding-screws I and J. K is a binding-screw for connecting with the upper coil or rod.

I also obtained rotation of the iron wire whilst the wire was in a horizontal position, its ends resting in hollows in the ends of the iron axes of the two fixed coils, and the ends of those axes and of the movable wire lying upon the surface of pools of mercury in small watch-glasses. The movable iron wire was inclosed in the axis of a thin iron tube within a fixed coil, having appropriate and similar poles at its ends. The current from the thermo-pile produced very rapid rotation. This result proves that the rotations are not due to terrestrial magnetic influence.

As the directions of magnetic polarity, electric current, and rotation agree with those in the different forms of Ampère's experiment, and as in most, if not all, of the previously known cases of rotation of a bar-magnet or conducting-wire on its axis an electric current passes through the end of the bar or wire, it is evident that those rotations were due, not only to the portions of current in the mercury, and fixed conductors connected with it, near the middle of the magnet or wire, but also to the influence of the currents in the fixed conductors near the ends of the magnet or wire.

[*Note added September*, 1875.—It having been suggested by Professors Maxwell and Stokes that the rotation in the foregoing experiments was due to the influence either of the magnetism of the fixed magnets or of the current in the fixed conductors, near the ends of the movable wire or magnet, upon the portions of current in the cups of mercury, I diminished the internal diameter, both of the upper and lower cups, from 4 millims. to 1·75 millim., and arranged the following apparatus and experiment.

The fixed upper wire was of brass 2·5 millims. diameter and 60 millims. long; it had no coil upon it, and was used as a conductor only; its lower end terminated in a fine point of a steel needle protecting 6 millims. The lower fixed wire, also used as a conductor only, was of platinum to resist the action of the mercury; it was 2·3 millims. diameter and 75 millims. long, with a cavity in its upper end 3·5 millims. deep and 1.75 millim. diameter, and containing a thin plate of ruby in its lower part, with a minute hole in the centre for the needle-point to rotate in. The movable wire was 2·5 millims. diameter and 125 millims. long, its upper half being composed of soft iron and its lower half of brass; its lower end terminated in a needle-point like that of the upper fixed wire, and its upper end had a cavity and perforated ruby plate like that in the lower fixed wire. A voltaic coil 60 millims. long and 7 millims. internal diameter, composed of four layers of cotton covered with stout copper wire, was used to magnetize the iron half of the movable wire, and fixed by means of a separate support in a proper vertical position beforehand, so as to inclose in its axis the iron wire portion only. The little cups were also each half filled with a minute globule of mercury before putting the movable wire into its place.

After adjusting the wire so as to make rotation easy, a current from 6 Grove's elements of one-pint capacity, arranged as a series of 6, also as a double series of 3, was passed through the coil and vertical wires; and the direction of the portion of the current in the coil alone, also in the vertical wires alone, was varied; but notwithstanding that plenty of current passed, no signs of rotation could be detected. These results, therefore,

* By a "right-handed" coil, I mean one the upper end of which rotates in the same direction as the hands of a watch.

† I have found this apparatus very convenient for such experiments.

strongly support the opinion that the rotation in the experiments was due to the action of the portions of the current in the cups of mercury.]

Linnean Society, Dec. 16.—Dr. G. J. Allman, F.R.S., president, in the chair.—The following papers were read:—On the structure and development of the bird's skull (part II.), by W. K. Parker, F.R.S. This and the former paper are parts of a large piece of work done by the writer in this particular field. A similar paper on the skull of Passerine birds appears in the present number of the Transactions of the Zoological Society; to be followed by another on the same subject. The writer's wish to work out a large series of well illustrated papers on the bird's face arose from the new interest given to this special research by Prof. Huxley's masterly memoir "On the Classification of Birds" (Proc. Zool. Soc., April 11, 1867), and his paper "On the Classification and Distribution of the Alectoromorphæ" (Ibid, May 14, 1868). The writer has worked out this subject in two ways, viz., by exhaustive work at one type of skull, making research in every part, and also by taking a part of the skull, the fore-face, and comparing this part in many types. The present paper is a piece of the latter kind of work, but begins with some new embryological details to serve as a supplement to his memoir on the fowl's skull (Phil. Trans., 1869); and this especially with regard to the development of that most interesting but puzzling bone, the "columella auris." This is shown to be developed in the house-martin (*Chelidon urbica*) in the same manner as in the reptilia. As Prof. Huxley sought, in his memoir, to give a morphological classification of birds based on the cheeks and palate, it has been the wish of the writer to carry on his friend's work, and to test it as well as extend and give it form and body. In the present paper the meaning of the peculiar structure of the face in crows, sparrows, warblers, &c. (Prof. Huxley's Coracomorphæ), is sought to be made plain by reference to the development and metamorphosis of the parts. In these the single vorner of the adult is shown to be constructed out of four bones and two cartilages; and all this composite structure is seen in them to be fused with the nasal capsule. This form of face, the most specialised of any of the class is called the "Œgithognathous" face or palate; and the huge army of birds possessing it are called "Œgithognathæ." Thus we have two terms for the group; first, a zoological "Coracomorphæ;" and second, a morphological "Œgithognathæ;" and these two groups are almost superimposable. In other birds, however, with open palates, the "Schizognathæ;" or with strongly closed and united palates, the "Desmognathæ," the zoological and morphological groups are not capable, in many instances, of being laid fairly the one on the other. Prof. Huxley put the Goatsuckers and Humming-birds amongst his "Œgithognathæ;" in the present paper they are shown to be as truly schizognathous as the Fowl or the Plover. In this paper the skull of these two types is largely illustrated. Many kinds of the desmognathous type of palate are described and figured, and their varieties explained. This is largely done with the birds of prey, amongst which the writer puts the Cariama (*Dicholophus*). Lastly, the schizognathous face is illustrated in the skull of the Sea-mew. Birds of the Gull tribe are shown to arise from the specialisation of the Plover type; they are a high kind of Charadrian bird. An interesting discussion followed, in which Dr. P. L. Sclater and Dr. Murie took part.—Notes on the plants collected and observed at the Admiralty Islands March 3–10, 1875, by Mr. H. N. Moseley.—On a sporl of *Paritium tricuspe*, by Dr. C. King.—Supplement to the enumeration of the fungi of Ceylon, by the Rev. M. J. Berkeley and Mr. C. E. Broome. Two interesting new genera are here described, *Endocalyx* and *Actiniceps*, possibly intermediate between Myxogastres and Trichogastres.

CAMBRIDGE

Philosophical Society, Nov. 29.—The following communication was made to the Society on the temperatures observed in a deep boring at Speremberg near Berlin, as given in a report of a paper by Professor Mohr, of Bonn, by Mr. O. Fisher (NATURE, vol. xii. p. 545). The greatest depth recorded is 3390 feet. The temperatures are given in Reaumur's scale. The author showed that the equation

$$v = -\frac{251}{10^8}x^2 + 0{\cdot}012982x + 7{\cdot}1817,$$

in which v is the temperature, and x the depth, exactly represents the temperature curve. This curve will give a maximum temperature of

40°.7532 R., or 123°.6947 Fah.,

at a depth of 5171 feet. If there was no cause to disturb the temperature, it ought to conform to a straight line, given by the above equation altered by omitting the term in x^2. Consequently a cause was sought which would change such a straight line to the parabolic form. The first cause examined was a change in the conductivity of the strata depending on the depth, and it was found that a law, which would make the conductivity vary inversely as the distance of any point above the level of greatest temperature, would account for the observed facts. But it was argued that such a law was entirely improbable. The next cause examined was the effect of the percolation of meteoric water through the strata, and the result was found to be that this circumstance would account for the observed temperatures, provided the quantity of water which passed through the rock in a unit of time bore a certain ratio to the quantity of rock passed through. The quantity of water requisite to produce the effect had not been determined. It was remarked that the results of this investigation make it appear that the true law of underground temperature would be better obtained from borings of moderate than of very great depth, because the disturbance of the temperature curve from the rectilinear form is greater the further we descend.

MANCHESTER

Literary and Philosophical Society, Nov. 8.—Alfred Brothers, F.R.A.S., in the chair.—The fauna of Cymmeran Bay, Anglesea, by John Plant, F.G.S. (part 2).

Nov. 30.—Edward Schunck, F.R.S., president, in the chair.—On the estimation of very small quantities of lead and copper, by M. M. Pattison Muir, F.R.S.E., Assistant Lecturer on Chemistry, Owens College.—On certain circumstances which affect the purity of water supplied for domestic purposes, by M. M. Pattison Muir, F.R.S.E., Assistant Lecturer on Chemistry, Owens College.

BERLIN

German Chemical Society, Dec. 13.—A. W. Hofmann, president, in the chair.—Lothar Meyer described an experiment to show that iodine does not fuse in a vacuum-tube but only in tubes filled with air; pressure being a condition of its fusion.—E. Schunck and H. Roemer have found a new isomeride of alizarine in the residues of the manufacture of the latter body. It is soluble in cold baryta-water with a dark red colour, likewise in lime-water. Its power of crystallisation is very great; but for dyeing purposes it is useless.—L. Friedburg compared various methods for purifying sulphuret of carbon. For manufacturing purposes he recommends distillation over palm-oil; but to obtain it chemically pure he prefers the action of fuming nitric acid, which attacks the impurities only, but not the sulphuret of carbon. At the same time a violet substance is formed. Sulphuret of carbon dissolves nitrous, hyponitrous, and sulphurous acid gas.—A. Flückiger has studied the explosive decomposition of white precipitate mixed with iodine.—E. de Souga heated the amalgams of silver and of gold to the temperature of boiling sulphur and found that at this temperature they retained a considerable proportion of mercury.—V. Merz and K. Schellenberger proved cyanogen to be able to produce substitution in aromatic hydrocarbons.—F. Beilstein and A. Kurbalow described the preparation of dichloraniline and of trichloraniline by passing chlorine into a solution of aniline in acetic acid.—W. Michler has succeeded in forming a urea with four ethyl groups, replacing its four atoms of hydrogen, by passing oxychloride of carbon into diethylamine. This compound, tetra-ethylated urea is a liquid, and this fact explains that it has been overlooked by former investigators.—Aug. Laubenheimer described metachloronitrobenzol and its derivatives, viz. a chlor-azobenzol, chlor-hydrazobenzol, and chlor-oxazobenzol; compounds distinguished by their power of crystallisation.—H. Scheiding has transformed bromonitro-napthylamine (alpha) by oxidation into phthalic acid, and draws conclusions from this fact to explain its constitution.—L. Jackson has prepared a brominated bromobenzol and a brominated soluidine.—C. Liebermann and Gissel have investigated the relationship between two compounds, viz., chrysophanic acid, $C_{14}H_6(OH)_2O_2$, contained in rhubarb and other plants (isomeric with alizarine); and of chrysaminic acid, $C_{14}H_2(NO_2)_4(OH)_2O_2$, a product of the action of nitric acid on aloes. It has generally been supposed that the latter substance is a nitro-substitution compound of the former. This, however, is now proved to be erroneous. Hydrochrysammine, the reduction-product of chrysaminic acid is now proved to be

$$C_{14}H_2(NH_2)_4OH_2O_2 (= C_{14}H_{12}N_4O_3),$$

and not $C_{14}H_{12}N_2O_6$, as formerly stated by Dr. Schunck. The

sulphate of this body, treated with nitrous acid, yields *a new isomeride* of alizarine, called chrysazine, and not chrysophanic acid, as would be the case if the former view were correct. At the same meeting, therefore, two new isomerides of alizarine have been announced, and thus of eight isomerides considered possible according to present views, seven have actually been discovered.

VIENNA

Imperial Academy of Sciences, Oct. 14.—The following papers, &c., were communicated :—Description of a new air-ship, by M. Codron.—The crania of the Novara collection, by M. Zuckerhandl.—Notes from the chemical laboratory of Innsbruck University, by M. Barth and others (treating of the action of fuming sulphuric acid on benzo-sulpho-acid and benzo-disulpho-acid, some derivatives from ellagic acid, nitro derivatives of anthraflavone, new naphthaline derivatives, and ferrocyanide of tetramethylammonium).—The independent formation-law of continued fractions, by M. Günther.—The development of the Euler Algorithmus, by M. Klug.—Researches on the separation of aqueous vapour in plants, by M. Eder. He first examines the external surfaces of plants as regards permeability for aqueous vapour ; then the evaporation through leafless branches ; and thirdly, the behaviour, as regards evaporation, of those parts of plants that are richer in water. He then describes experiments on transpiration of leafy branches and rooted plants under various conditions of moisture, light, motion of air, &c.—On the action of glycerine on starch at high temperatures, by M. Zulkowsky.—On the heat phenomena which occur on solution of ammonia in water, and their utilisation in employment of this salt for cold mixtures, by M. Tollinger.—On hypertrophic thickening in the interior of the aorta, by M. Schnopfhagen.—On Malfatti's problem, and the construction and generalisation by Steiner, by M. Mertens.—On Cinchonin, by M. Weidel.—On the heat-equilibrium of gases acted on by external forces ; on the heat-conduction of gases ; and on integration of partial differential equations of the first order, by M. Boltzmann.—Observations (meteorological and magnetic) at Vienna Observatory, in July to September.

Oct. 21.—An experiment towards explaining terrestrial magnetism, by M. Benedict.—Involutions of the chords in cissoids, by M. Jahradnik.—Researches on the colouring matters of bile, part v., On the action of bromine on bilirubin, by M. Maly. He shows that the molecule of bilirubin is twice as large as has hitherto been supposed.—On the double tangents of curves of the fourth order with three double points, by M. Durége.—Researches on the nature of the salmon (*Salmo Schiffermülleri*, Bloch) found in the lakes of Salzkammergut, Salzburg, and Berchtesgaden, by M. Fitzinger.—On occurrence and biology of Laboulbeniaceæ, by M. Peyritsch.

Oct. 28.—On development of the elements of Crustacea, by M. Hœber.—Report on a journey in the western part of the Balkan and neighbouring regions, by M. Toula.—On a new condensation-product of gallic acid, by M Oser.—On the green colouring matter of *Bonellia viridis*, by M. Schenk.

Geological Society, Nov. 16.—The discovery of lake dwellings in the peat-bogs near Laibach, by Ch. Deschmann. These were discovered accidentally on the occasion of a road ditch being opened, and were afterwards systematically explored for the Laibach Museum. The extent of the lake-dwellings hitherto uncovered amounts to about 600 square fathoms. They cover an area of about 13 fathoms in breadth, extending parallel to the border of the ancient lake. The piles, some thousands in number, are rammed into the clay which forms the bottom of the peat-bog, their broken ends projecting 1 or 2 feet above the clay. Above the latter lies a deposit 5–6 inches thick, containing chiefly the remains of human industry, together with bones of various animals. This again is covered by the peat to a thickness of 5–6 feet. The lake-dwellings near Laibach are of special interest on account of the great abundance of bones and harts-horn, most of them showing signs of workmanship. The remains of stag alone that were found are supposed to belong to 200 different individuals ; and besides various remains of ox, buffalo, hog, wild boar, goat, sheep, bear, badger, beaver, more rarely of wolf and lynx, &c., were discovered.—On the volcanoes of the Isle of Réunion (Bourbon), by Dr. R. Drasche. The author proved that the eruptive action since the first outbursts has proceeded continually from west to east. The oldest lava streams have an acid (strachytic) character ; the later, up to the present day, are basaltic.—A fossil land-turtle from the Vienna basin, by G. Haberlandt. It was found in the later Tertiary, in a quarry near Kalksburg, and is the first land-turtle ever discovered in Austrian Niogene deposits, whilst sea and river turtles occur frequently therein. The fossil was named *Trionix precedens*.—M. Zugmaier showed an *Inoceramus* found in the Vienna sandstone near Klosterneuburg, a very important discovery in reference to the geology of the Alps, regarded as forming another proof of the justness of the views always maintained by the Austrian geologists, that the sandstone-strata bordering the northern part of the Alps belong chiefly to the Cretaceous period.—M. Paul gave a report of the results obtained by him in the course of last summer concerning the Karpathian Sandstone in Silesia, Hungary, and the Bukovina, that forms a direct continuation of the Alpine Vienna Sandstone just mentioned. He is convinced that the so-called Ropianka group of these sandstones, which contains the petroleum, belongs also to the Cretaceous formation.—M. Vacek exhibited an interesting fragment of a jaw-bone from a very small and probably young *Mastodon longirostris*, found in the Belvedere strata near Vienna. It had been presented to the Geological Institution by Lieut. Tihu.

WELLINGTON, N.Z.

Philosophical Society, Aug. 7.—Address by the President.—Dr. W. Z. Buller, C.M.G., gives a narrative of the progress of the scientific societies in New Zealand, and the various works which have been written on the natural history of the colony, and reviews the work done by the Society during the past year, as published in vol. vii. of the "Transactions" of the New Zealand Institute :—"From year to year the scientific work of the New Zealand Institute has kept pace with the rapid progress of the colony, and the last volume of 'Transactions' (No vii.) is in every way worthy of its predecessors, both as to bulk and quality. On a cursory perusal it is evident that our Society has done its fair share of work during the year, no less than twenty-four of the papers selected by the governors as worthy of publication having emanated from our members. As most of you are aware, our vice-president, Mr. Travers, is one of the most industrious of our working members, and the present volume contains a lengthy contribution from him, entitled 'Notes on Dr. Haast's supposed Pleistocene Glaciation of New Zealand.' The author dissents entirely from the learned doctor's views, as propounded in his report to the Provincial Government of Canterbury in 1864, and since repeated ; and following up his former article on 'The Extinct Glaciers of the South Island,' he has now placed before us an able exposition of his own views on this subject. Another important paper read before the Society during the past year is that by Dr. Hector, on Whales ; and the excellent plates which accompany it, from photographs by Mr. Travers, add much to the interest of the article. It contains a full description of *Neobalæna marginata*, founded on a specimen which was captured among a large school of black-fish at Stewart's Island, and forwarded to the Colonial Museum by Mr. Charles Traill ; also of the 'sulphur-bottom' (*Physalus australis*), the skeleton of which is now in the Wellington Botanic Gardens ; and of that interesting form of zyphoid whale known as *Berardius hectori* from a specimen cast ashore in Lyall Bay in January last. It is to be hoped that Dr. Hector will be able to carry out his intention of publishing while in England a monograph of the Cetacea inhabiting the Southern seas, for which, as he informs me, he has collected and taken home ample material. There is probably no other section of Zoology in which a contribution of this sort would be more acceptable to the *savans* of Europe, owing to the present neglected state of its literature and the confusion of nomenclature in which many of the species are involved. There is another article from the same pen, on New Zealand Ichthyology, which contains descriptions of no less than sixteen new species of fishes, all taken recently on our coast, thus proving that this field of investigation is far from being exhausted. In the section Botany, the first article is a paper read by Mr. Buchanan in November last, on the flowering plants and ferns of the Chatham Islands, the materials being drawn from the collection in the herbarium of the Colonial Museum, nearly the whole of which was made by Mr. Henry Travers during his two expeditions to those islands in 1866 and 1871. The article throughout bears testimony to Mr. Buchanan's usual care and accuracy, and the illustrations, five in number, are very beautifully executed. That of the so-called Chatham Island Lily (*Myosotidium nobile*), a handsome plant, with large glossy leaves and clusters of blue flowers, which I was fortunate enough to discover during a visit to the Chathams just twenty years ago, is especially noticeable. Our late president, Dr. Knight, resuming a subject in which he has already

made several important contributions to science, presents us with a valuable paper on New Zealand lichens, and with another containing descriptions of some new species of Gymnostomum, all the carefully drawn illustrations being from the author's own pencil. The papers on chemistry have emanated, as usual, from Mr. Skey, the analyst to the Geological Survey, the value of whose work in this department of science has already been brought prominently before you by a former occupant of this chair. I will not detain you longer, as there are several papers to be read; but I would just point out that the eminently practical treatise by Mr. Lemon, on duplex telegraphy, and the suggestive paper by Mr. Mackay, on the hot winds of Canterbury, show that other subjects have been discussed, and that the attention of our Society has not been confined to any particular branch of scientific inquiry; that, on the contrary, it has during the past year kept in view the avowed object of its existence, viz. 'the development of the physical character of the New Zealand group: its natural history, resources, and capabilities.'"—A paper was read from the Ven. Archdeacon Stock, containing remarks upon a large bat that had been seen by him in 1854, which he believed to be a new variety. Mr. Kirk stated that he had seen a large bat at the Clarence River, but he had been unable to distinguish it from *Scotophilus tuberculatus*.—The President read a paper entitled "Notes on *Gerygone flaviventris*." The paper contained extracts from "The Birds of New Zealand," and observations in reply to a paper from Mr. Justice Gillies, in last year's volume of "Transactions."—A paper entitled "Remarks on Dr. Finsch's Paper on Ornithology in vol. vii. of 'Transactions of the New Zealand Institute,'" was also read by the President. The paper contained criticisms on Dr. Finsch's views respecting classification, as propounded in a paper read before the Otago Institute. A discussion ensued, in which the author of the paper and Messrs. Kirk and Graham took part, on the question, "What constitutes a species?" The President contended for the specific value of *Apteryx mantelli* of the North Island, on the ground that it was readily distinguishable from the other bird, and that the variation was *constant*; while Prof. Kirk agreed with Dr. Finsch, who proposes to call it *Apteryx australis* var. *mantelli*, considering that the bird discovered in the North Island is merely a variety of the species in the South—*Apteryx australis*—the slight difference between them being insufficient to warrant their separation.

Aug. 21.—J. Carruthers, C.E., Engineer-in-chief for the Colony, On volcanic action regarded as due to the retardation of the earth's rotation.—Mr. J. C. Crawford, F.G.S., On the igneous rocks of Wellington. The paper pointed out in a lucid manner the course that past explorations had taken in regard to the igneous rocks of this province, and indicated the direction that future explorations should take.

California

Academy of Sciences, Sept. 20.—Dr. Blake made some remarks on the old Sierra glacier in the neighbourhood of Johnson's Pass, at the head of the south fork of the American river. The pass forms a low gap in the mountains about 7,500 feet above the sea, and extends about a mile and a half from north to south, the summit of the mountain being nearly level for that distance. To the east of the pass and 1,000 feet below is Lake Valley, fifty miles long from north to south, and twenty miles broad in some parts; this valley contains the basin of Lake Tahoe, which has a depth of 1,600 feet. The topography of the pass is such that no moraine matter would reach the head of it until the basin of Lake Valley was filled by ice above the level of the pass, or by a glacier 1,000 feet thick, nor during the decline of the cold would any extensive glacier form there after the level of the ice in Lake Valley had fallen below the level of the pass. Such being the case, we have at the head of the American valley the results of glacial action during the middle of the glacial epoch, or at least during the time the glacier in Lake Valley was increasing from a thickness of 1,000 feet to a thickness of 1,600 or 1,700, and also whilst it was diminishing from its maximum depth down to the level of the pass. The indications are that during this period a very high summer temperature must have prevailed, alternating with the greater cold of winter. The considerations on which this conclusion is founded are, first, the fact that no permanent ice-covering could have existed at the head of the pass at the time the Lake Valley glacier had already reached a thickness of 1,000 feet, otherwise moraine matter could not have been deposited in the vast moraines now found at the head of the pass. Notwithstanding the great winter cold and the increased snowfall, at least far on in the glacial epoch, the heat of the summers must have been more than sufficient to thaw the annual snowfall at this elevation when its thickness was not increased by inflowing glaciers. Another fact indicating the existence of a high summer temperature is the comparatively small extension of the glacier down the valley of the American river. During the height of the glacial epoch the thickness of the glacier at the head of the valley must have been 600 or 700 feet above the level of the pass, and yet the bulk of the moraine matter it transported has been deposited as terminal and lateral moraines within eight miles of the summit. As the valley in this distance has only fallen about 800 feet the melting of the ice must have been much more rapid than it would be with our present summer temperature.—Mr. Lowry, of the U.S. Coast Survey, read a paper on a modification of what is known as the three-point problem in hydrographical surveying, by which a position would be determined by means of two points the distance of which was known, and a point on the shore of undetermined distance.

BOOKS AND PAMPHLETS RECEIVED

British.—The Universe: F. A. Pouchet, M.D. (Blackie).—Time and Time Tellers: J. W. Benson (Hardwicke).—Official Guide to the Manchester Aquarium: W. Saville Kent.—Report of the First Annual Conference of the Cryptogamic Society of Scotland.—Memorials of Harvey: J. H. Aveling, M.D. (Churchill).—Tales and Traditions of the Eskimo; Dr. Henry Rink (Blackwood).—The Sea: Jules Michelet (Nelson).—The Arctic World (Nelson).—Map of India indicating the probable Route of the Prince of Wales (Stanford).—The Cruise of the *Dwarf*: Captain Bax (Murray).—Solid Geometry. Vol. i.: P. Frost (Macmillan).—Water Analysis: J. D. Macdonald (Churchill).—Physics of the Ether: S. Tolver Preston (Spon).—Proceedings of the Geological Association. Vol. iv. No. 4.—Quarterly Journal of the Geological Society. No. 124.—Quarterly Journal of the Meteorological Society No. 16.

American.—Abstract of Results on a Study of the Genera Geomys and Thomomys: Dr. Elliott Coues, U.S. Army.—Elements of Infinitesimal Calculus: James G. Clark (Lockwood).—On a New Method of obtaining the Differentials of Functions: J. Minot Rice and W. Woolsey Johnson (New York, Van Nostrand).—Theory of the Moon's Motion: J. N. Stockwell, M.A. (Boston, Lippincott).—Systematic Catalogue of the Vertebrate of the Eocene of New Mexico: E. D. Cope, A.M. (Washington).—Address of the Ex-President Joseph Lovering before the American Association, Hartford.—A Review of the Fossil Flora of North America: Leo Lesqeureux (Washington).—Monthly Report of the Department of Agriculture, U.S.—Memoirs of the American Association for the Advancement of Science, 1875 (Salem).—The Spider of the United States: N. M. Heutz, M.D. (Boston).

Foreign.—Jahresberichte der Commission zur Wissenschaftlichten Untersuchung der deutschen Meere in Kiel, 1872-3.—Memoire de la Société de Physique et d'Histoire Naturelle de Genève.—Classification de 40 Savons Végétaux: M. Bernardin (Gand, Annoot-Braeckman).—Ueber die Störungen der Grossen Planeten insbesondere des Jupiter: P. A. Hansen (Leipzig, S. Hirzel).

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